BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001.1] The present invention relates to a method of positioning in a container, such as a can, a device for automatically extracting a straw, and its associated device.

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2. Discussion of Background Information

[0002] Numerous types of containers are commercially available: plastic bottles, glass bottles, metallic cans, cardboard packagings which can have various shapes allowing for the packaging of any type of liquid food products.--

Please replace paragraphs [0009]-[0014] in the specification with the following (see Appendix 2 for changes):

--SUMMARY OF THE INVENTION

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[0009] According to one aspect of the invention, there is provided a method of positioning, in a can including a container closed by a cover, a device for automatically extracting a straw. The device is of the type which includes a straw-supporting member constituted by an elastically deformable retention arm adapted to be tensioned by elastic deformation. The arm includes a retention tube for the straw. The method is characterized in that it provides for tensioning the arm by the direct or indirect effect of the cover during the coupling of the cover to the device.

[0010] The method includes the following preliminary steps:

a. fixing or securing the straw to the retention arm to form an intermediate subassembly, namely, the straw-extraction device subassembly; and

b. coupling of the intermediate subassembly to the cover to form a closure subassembly;

the method may also include the following complementary steps:

c. filling up the container with the desired beverage;

d. positioning the closure subassembly in the container;

e. crimping the cover on the container.

[0011] According to another aspect of the invention, the method provides for tensioning the retention arm by the action of the cover on a projection affixed to the retention arm, or on the straw retained by the arm.

[0012] The invention also relates to a device for extracting a straw adapted to implement the method, which comprises a straw-supporting member constituted by an elastically deformable retention arm, one of the ends of which is connected to a peripheral ring or annular ring, whereas the free end of the arm includes a mechanism for retaining the straw.

[0013] According to another aspect of the invention, the mechanism for retaining the straw includes a retaining tube portion.

[0014] According to another aspect of the invention, the device is obtained in a single

piece made of injected plastic material, whereas the annular ring includes a succession of deformable lips that are peripherally sandwiched, during the crimping of the can, between the cover and more particularly its crimping groove and the upper peripheral rim of the opening of the container.

[0014.1] The invention also provides for a method of coupling a device for automatically extracting a straw in a container to a cover, wherein the device includes a straw-supporting member that is adapted to be subjected to elastic deformation, and wherein the method includes coupling together the cover and the device and causing the straw supporting member to move from a first position to a second position.

[0014.2] The causing may comprise one of deflecting the straw supporting member and tensioning the straw supporting member. The straw supporting member may move from the first position to the second position when, directly or indirectly, the cover is coupled to the device. The straw supporting member may comprise an elastically deformable retention arm that is adapted to be tensioned by elastic deformation. The elastically deformable retention arm may include a retention mechanism adapted to retain the straw. The method may further comprise fixing the straw to the straw-supporting member to thereby form an intermediate subassembly and coupling of the intermediate subassembly to the cover to form a closure subassembly. The fixing may comprise fixing the straw to an elastically deformable retention arm of the straw-supporting member to thereby form an intermediate subassembly.

[0014.3] The method may further comprise filling a container with a desired beverage, positioning the closure subassembly in the container, and securing the cover on the container. The securing may comprise crimping the cover on the container.

[0014.4] The straw-supporting member may comprise an elastically deformable retention arm having a projection and the method may further comprise engaging the cover with the projection, whereby the elastically deformable retention arm is deflected or tensioned. The straw-supporting member may comprise an elastically deformable retention arm and the method may further comprise engaging the cover with the straw, whereby the elastically deformable retention arm is deflected or tensioned.

[0014.5] The invention also provides a device for extracting a straw comprising a straw-supporting member having an elastically deformable retention arm which comprises a free end and at least another end. A body comprises one of a peripheral portion and an annular portion. The at least another end of the elastically deformable retention arm is connected to the body. The free end includes a straw retaining mechanism. The device is adapted to be coupled to a container.

[0014.6] The straw retaining mechanism may comprise a retaining tube portion. The straw retaining mechanism may be made as a single piece. The straw retaining mechanism may comprise an injected plastic material. The body may comprise a succession of deformable lips, whereby the deformable lips are adapted to be peripherally sandwiched upon

crimping of a cover onto a container. The deformable lips may be adapted to be peripherally sandwiched between a crimping groove and an upper peripheral rim of the container. The straw retaining mechanism may comprise a retention arm and an actuation arm that is adapted to be actuated and displaced during an opening of the container. The straw retaining mechanism may comprise a first and a second elastically deformable zone, the first elastically deformable zone enabling a retention arm to move in a first pivoting direction and the second elastically deformable zone enabling a retention arm to move in a second pivoting direction. The first pivoting direction may comprise movement about a vertical pivoting axis, and the second pivoting direction may comprise movement about a horizontal pivoting axis.

[0014.7] The invention also provides for a method of coupling a device for automatically extracting a straw to a cover, wherein the device includes a straw-supporting member that is adapted to be subjected to elastic deflection, wherein the method comprises coupling together the cover and the device and causing the straw supporting member to move from a first position to a second position.

[0014.8] The straw supporting member may move from the first position to the second position when the cover is coupled to the device. The straw supporting member may comprise an elastically deflecting retention arm. The elastically deflecting retention arm may include a retention mechanism adapted to retain the straw. The method may further comprise fixing the straw to the straw-supporting member to thereby form an intermediate

subassembly and coupling of the intermediate subassembly to the cover to form a closure subassembly. The fixing may comprise fixing the straw to an elastically deflecting retention arm of the straw-supporting member to thereby form an intermediate subassembly. The method may further comprise filling a container with a desired beverage, positioning the closure subassembly in the container, and securing the cover on the container.

[0014.9] The invention also provides a device for extracting a straw comprising a straw-supporting member having an elastically deflectable retention arm which comprises a free end and at least another end. A body comprises one of a peripheral portion and an annular portion. The at least another end of the elastically deformable retention arm is connected to the body. The free end includes a straw retaining mechanism. The device is adapted to be coupled to at least one of the cover and a container. The straw retaining mechanism may comprise a retaining tube portion. The body may comprise a succession of deformable lips, whereby the deformable lips are adapted to be peripherally sandwiched upon crimping of a cover onto a container. The straw retaining mechanism may comprise a retention arm and an actuation arm that is adapted to be actuated and displaced during an opening of the container. The straw retaining mechanism may comprise a first and a second elastically deflectable zone, the first elastically deflectable zone enabling a retention arm to move in a first pivoting direction and the second elastically deflectable zone enabling a retention arm to move in a second pivoting direction.

Please replace paragraphs [0016]-[0035] in the specification with the following (see Appendix 3 for changes):

[0016] Other characteristics and advantages of the invention will become apparent from the description that follows, with reference to the annexed drawings, which are only provided by way of non-limiting examples.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016.1] Figures 1 and 2, respectively, show a perspective view of the opening of a container such as a metallic cylindrical can including the device of the invention wherein:

Figure 1 shows the sealed can;

Figure 2 shows the open can, once the cap has enabled the straw to project out of the opening;

Figures 3, 4, 5, 6, 6a and 7 show a first embodiment of the extraction device;

Figures 8, 9, 10, 11, 11a and 12 show a second embodiment of the extraction device;

Figures 13, 14, 15, 16, 17 and 18 show the phases of the method, using the first embodiment of the extraction device;

Figures 19, 20, 21, 22, 23, and 24 show the phases of the method, using the second embodiment of the extraction device; and

Figure 25 is a perspective bottom view of an alternative of the second

embodiment of the device.

DETAILED DESCRIPTION OF THE INVENTION

[0017] The invention relates to a method of positioning a straw automatic extraction device, generally designated by the reference numeral 1. The device is adapted to automatically extract, when it is being opened, a straw 2 arranged within a container 3. The extraction device 1 is advantageously described in the particular case of metallic cylindrical cans whose opening systems are constituted in a known fashion by a push ring 4 and a precut tongue 5, also called a cap. The cap 5 can pivot inwardly of the container 3 under the effect of the ring to free the orifice 6 of the opening system, as shown in Figures 1 and 2. It is understood that the automatic extraction device 1 according to the invention could be modified to be adapted to other types of containers, or to other types of opening systems without leaving the scope of protection of the invention.

[0018] The extraction device 1 is adapted to be used with the method of the invention and comprises a straw-supporting member 7 constituted by an elastically deformable retention arm 8, one of the ends of which is connected to a peripheral ring or annular ring 9. Furthermore, the free end of the arm 8 includes a mechanism for retaining the straw 2, which includes a retaining tube portion 10 that is advantageously open to provide it with enough elasticity to ensure pinching of the straw 2.

[0019] The extraction device 1 is advantageously obtained or made in a single piece of

injected plastic material. The annular ring 9 includes a succession of deformable lips 15 that are peripherally sandwiched during the crimping of the can 3 between the cover 14, and more particularly its crimping groove and the upper peripheral rim of the opening of the container 3, as seen in Figures 6a and 11a.

[0020] In a first embodiment of the extraction device 1 shown in Figures 3-7, the mechanism 10 for retaining the straw is extended upwardly by a projection 11 for deforming the arm that extends upwardly.

[0021] The projection 11 is constituted by a cylindrical wall portion whose upper end 12 is adapted to come into abutment on the lower wall 13 of the cover 14 during its coupling to the device 1, as shown in Figures 6 and 16, and, of course, during the crimping of the cover 14, thus causing the downward deformation along direction F of the arm 8, as shown in Figure 6 and Figure 16.

[0022] In a second embodiment of the extraction device 1 shown in Figures 8-12, the retention arm 8, and more particularly its retaining mechanism 1, does not include a deforming projection. According to this alternative embodiment, the deforming of the arm occurs by the direct effect of the cover on the straw. Furthermore, the arm 8 includes an actuating arm 18 that is adapted to be actuated and displaced by the cap or tongue 5 during the opening of the can. In this alternative embodiment, the elastic linkage of the retention arm 8 with the peripheral ring 9 is obtained by the succession of two elastically deformable

zones: a first deformation zone 16 for enabling the retention arm 8 to displace in horizontal pivoting about a vertical pivoting axis XX', and a second deformation zone 17, distinct from the first deformation zone 16, for enabling the arm 8 to displace in vertical pivoting about a horizontal pivoting axis YY'. It is noted that the second deformation zone 17 is a deformable flat section, but it could have any other shape, and may, in particular, have a arrangement similar to that which is shown in Figure 25.

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[0023] In the two embodiments of the extraction device 1, it is noted that in the non-stress rest position, as shown in Figures 3, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15, 19, 20, and 21, the retention arm 8 extends from the peripheral ring inwardly, substantially horizontally, at least in a plane substantially parallel to the general plane H of the ring 9.

[0024] Conversely, in the prestress active position, as shown in Figures 6, 11, 16, 17, 22, 23, and 24, the retaining arm 8 forms, together with the general plane H of the peripheral ring 9, a sharp angle A comprised between 20 and 60 degrees and, for example, 40 degrees.

[0025] According to one method of positioning the extraction device 1, the retention arm 8 is elastically biased downwardly along direction F, such that, during opening, this elasticity is restored in order to have the straw 2 move or be extracted out of the opening 6, as shown in Figures 6, 11, 16 and 22 .

[0026] The stressing of the arm is done at the time the cover 14 is coupled to the device 1, as shown in Figures 6, 11, 16, 17, 22, and 23 by the direct or indirect effect of the cover

14 on the retention arm 8.

[0027] With the first embodiment of the device 1, the lower wall 13 of the cover 14 biases the retention arm 8 into a downward elastic prestress by its direct effect on the end 12 of the projection 11 for deforming the arm.

[0028] With the second embodiment of the device 1, the lower wall 13 of the cover 14 biases the retention arm 8 into a downward elastic prestress by its direct effect on the end 21 of the straw 2 retained by the tubular retaining portion 10.

[0029] It is understood that with the first embodiment of the extraction device 1, during the opening of the can, the cap or tongue 5 releases the retention arm 8 of the straw 2 which, having been elastically prestressed, returns to its inactive position to drive with it the end of the straw 2 which then projects out of the opening 6.

[0030] With the second embodiment of the extraction device 2, the end of the actuation arm 18 is arranged in the trajectory of the cap or tongue 5. Thus, during opening of the can, the cap or tongue 5 acts on or engages the actuation arm 18 to pivot the assembly which it forms with the retention arm 8 about the axis XX', and thus to place the end of the straw 2 in the zone of the opening 6. In this way, the straw 2 is allowed to project immediately through this opening 6 by the release of the prestress.

[0031] According to one embodiment, the invention provides for a method that includes the following preliminary steps:

a. Securing the straw 2 to the retention arm 8 by introducing the straw 2 into the retention tube 10 to form an intermediate subassembly 30, namely, the straw 2 and the extraction device 1 subassembly.

During this operation, it should be ensured that the straw 2 extends upwardly by an adequate height L comprised between 10 and 25 millimeters (see Figures 13, 14, and Figures 19 and 20).

b. Coupling the intermediate subassembly 30 to the cover 14 to form a closure subassembly 41.

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In this step, the subassembly 30 is engaged beneath the cover 14 and clipped to the latter by cooperation of the succession of lips 15 with the peripheral groove 31 of the cover (see Figures 15, 16, and Figures 21 and 22). Of course, the positioning of the device with its straw with the cover is done with a relative predetermined angular orientation. During the clipping of the subassembly 30 to the cover 14, the lower wall 13 of the latter, directly or indirectly, forces the retention arm 8 downwardly so as to place it in the prestress position, as shown in Figures 6, 16, and Figures 11 and 22.

[0032] During the bottling itself, the following complementary successive steps are undertaken:

c. filling the container 3 with the desired beverage;

d. positioning the closure subassembly 41 in the container 3, as shown in Figures

17, 18, and Figures 23 and 24; and

e. crimping the cover 14 on the container 3.

[0033] In the alternative embodiment shown in Figure 25, the second deformation zone 17 is a hollow open section, especially omega-shaped so as to provide the zone with appropriate elasticity.

[0034] The straw 2 used is advantageously a telescopic, flexed straw, i.e., one which includes a deformation accordion.

[0035] It is noted that the device can include a guiding ramp 90 for the end of the straw 2, as seen in Figures 9, 10, and 25.--

Please replace the Abstract with the Abstract of the Disclosure appended on the next page.